



Decadal Survey Tier 2 Mission Study Summative Progress Report

Aerosol-Cloud-Ecosystem (ACE) Decadal Survey Mission

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ACE is Societally and Scientifically Relevant



- ◆ ACE is the Tier II Climate Mission (science talks)
- ◆ ACE replaces and will be an advance on much/most of EOS/A-Train including MODIS, MISR, CloudSat, CALIPSO, Glory
- ◆ ACE is building on EOS/A-Train heritage:
 - *Instrument design*
 - *Mission design*
 - *Algorithms*
 - *Cal/Val approach*
- ◆ ACE is significantly multi/interdisciplinary, bringing together 4+ scientific communities:
 - *Aerosol (radiation/energy budget, geochemistry, air quality)*
 - *Clouds (radiation/energy budget, precipitation)*
 - *Ocean Ecosystems (biological productivity, carbon cycle)*
 - *Aerosol-Ocean Interactions (eolian nutrient deposition, aerosol precursor production)*



ACE Science Working Group



Sub-Teams	Name	Sub-Teams	Name
Management		Clouds	
HQ	Maring, Hal Bontempi, Paula Fiedl, Lawrence Neeck, Steve Starr, Dave* McClain, Chuck	Theory/Modeler	Jensen, Eric Stephens, Graeme Feingold, Graham Wu, Dong Marchand, Roger Fridlind, Ann Jackson, Gail Hou, Arthur Ackerman, Steve
Science Lead	Vane, Deb Famiglietti, Joseph		Platnick, Steve Mace, Jay Haddad, Ziad
Coordinator ESTO		Retreivals	Im, Eastwood Heymsfield, Gerry Racette, Paul Durden, Steve Tanelli, Simone
Ocean Ecosystems			
Theory/Modeler	Behrenfeld, Mike Boss, Emmanuel Follows, Mick Siegel, Dave Ahmad, Zia Wang, Menghua Gordon, Howard Arnone, Bob	Radar	
Retreivals	Smith, Jay Waluschka, Gene Wilson, Mark Kotecki, Carl Meister, Gerhard Holmes, Alan Brown, Steve	Aerosols	
OC Spectrometer	Hooker, Stan Maritorena, Stephane	Theory/Modeler	Colarco, Pete Nenes, Thanos Toon, Brian Reid, Jeffery Remer, Lorraine Mishchenko, Michael Kahn, Ralph Hu, Yong
Cal/Val	Nelson, Norm Loeb, Norm Kato, Seiji Pilewskie, Peter Callahan, Lisa Ellis, Armin Ghan, Steve	Retreivals	Diner, David Martins, Vanderlei Cairns, Brian Welton, Judd Hostetler, Chris McGill, Matt Winker, David
Radiation	Saltzman, Eric Mahowald, Natalie Gasso, Santiago Meskhidze, Nicholas Gao, Yuan	Polarimeter/Imager	Starr, David Redemann, Jens
Mission Design		Lidar	
Global Modeler			
Aerosol/Ocean Science		Cal/Val	



ACE SWG Meetings



♦ Many Long Telecons

- ❑ *Management*
- ❑ *Aerosol*
- ❑ *Cloud*
- ❑ *Ocean Ecosystems*
- ❑ *Ocean-Aerosol Interactions*
- ❑ *Instrument (4+)*
- ❑ *Cal/Val – Field Campaign*

♦ Formal Meetings

- ❑ *19-20 June 2008 - GSFC*
- ❑ *6-7 November 2008 – University of Utah*
- ❑ *10-12 March 2009 – Oxnard, CA*
- ❑ *5-7 August 2009 – Santa Fe, NM (Open Science Meeting)*
- ❑ *14-16 October 2009 – Columbia, MD*



ACE Report Agenda



ACE DS Mission: What We've Learned, Agreed Upon and Need To Do

Category	Content	Speaker	(min)
Introduction	The ACE Mission	H Maring	5
Importance of ACE	Ocean Ecology	A Gnanadesikan	20
	Climate	A Gettelman	20
ACE Science & STM's	Cloud Science and STM	J Mace	20
	Aerosol Science and STM	L Remer	20
	Ocean Ecology and STM	M Behrenfeld	20
	Ocean-Aerosol Science and STM	N Meskhidze	20
Instrument Concepts	Ocean Ecosystem Spectroradiometer	C McClain	12
	Cloud Radar	S Tanelli	12
	HSRL	C Hostetler	12
	Polarimeter	D Diner	12
	Additional Instruments	S Platnick	15
Mission Structure	Implementation Scenarios	L Callahan	25
	Cost and Schedule	A Ellis	
Recommendations	What Next	D Starr	15



Introduction to Science Talks



- ◆ Given the noise in the system as well as the breadth and complexity of ACE science, we thought a reminder of the scope and substance of the science addressed by ACE was appropriate.
- ◆ We asked two modelers (ocean ecosystem and climate) who are not part of the ACE SWG to provide a contextual overview.
- ◆ Speakers:
 - *Anand Gnanadesikan*
Oceanographer in the Oceans and Climate Group - NOAA/GFDL
Lecturer in Atmospheric and Oceanic Sciences – Princeton University
Research interests: vertical circulation of the ocean and the connections between physical circulation, the biosphere, and large-scale ocean chemistry
 - *Andrew Gettelman*
Climate modeler in Earth and Sun System Laboratory – NCAR
Research interests: aerosol indirect effects, climate modeling and climate feedbacks, water vapor and the tropical tropopause layer, climate impacts of contrails